

**Remarks/Arguments:**

Claims 1-56 are pending. Claims 1-56 stand rejected.

As a preliminary matter, applicants note that the Information Disclosure Statement filed on May 22, 2003 has still not been acknowledged by the Examiner. Applicants respectfully request that acknowledgement of the IDS be provided with the next official action.

**Rejections Under 35 U.S.C. 103**

The Office Action at page 2, paragraph 3, sets forth "claims 1-8, 11-12, 14/11, 14/12, 17-49 and 52-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hensel et al. (DE-19814575A1) in view of Stewart et al." Applicants respectfully traverse this rejection for the reasons set forth below.

Applicants' invention, as recited in claim 1, includes features which are neither disclosed nor suggested by either Hensel or Stewart, namely:

...a closed passive fiber optic ring having a portion thereof exposed to the sample gas or sample liquid...

...coupling means for i) introducing a portion of the radiation emitted by the coherent source to the closed passive fiber optic ring and ii) receiving a portion of the radiation resonant in the closed passive fiber optic ring... (emphasis added)

These features are described in Applicants' specification, for example, at page 4, lines 3-17.

Applicants' claimed invention is an apparatus for detection and measurement of trace species in at least one of a sample gas and a sample liquid. The apparatus comprises a closed passive fiber optic ring of which a portion of the passive fiber optic ring is exposed to a sample liquid or sample gas. Additionally, a portion of coherent radiation is coupled into the closed passive fiber optic ring with a portion of the radiation being resonant within the passive fiber optic ring being coupled to a detector.

Hensel is relied upon as disclosing "a passive fiber optic sensor ... [comprising] a fiber optic ring (10)." Hensel does not disclose or suggest, however, a closed passive fiber optic ring suitable to detect and measure trace species in a sample liquid or gas. Thus, the

Hensel reference lacks at least this feature of applicants' claimed invention. In addition to this fundamental difference, which would prevent cavity ring-down operation of the fiber system, Hensel teaches a "optical transmitter (2)," not a "coherent source (2)" as set forth in the Office Action. This additional difference, which includes broadband light sources, makes the Hensel reference unsuitable for cavity ring-down spectroscopy. Further, the Office Action readily admits that Hensel lacks other features of applicants' claimed invention, such as the claimed coupling means to introduce a portion of the radiation to the closed passive fiber optic ring and to receive a portion of the radiation resonant in the closed passive fiber optic ring.

To make up for this acknowledged deficiency, however, the Stewart et al. reference is relied on as disclosing "a plurality of couplers for coupling the light source to the optical fiber and the detector to the optical fiber." Applicants' note, however, that Stewart et al. also does not disclose or suggest that the optical fiber is a closed passive optical fiber. Rather, and as pointed out by applicants' in response to the last Office Action, the fiber optic element of Stewart et al. is neither passive nor a ring. Rather, and as clearly shown in figure 1 of the Stewart reference, the fiber optic element is a continuous open ended length of fiber in which a portion of the fiber is folded back on itself through a coupler that necessarily introduces losses. Further, the erbium-doped region of the fiber acts like an amplifier rather than a passive element. This is evident not only from figure 1 but also from the title of the invention (" ... absorption with fibre amplifiers ...") as well as the description of figure 1 on page 449 of the Stewart reference. Amplifiers are problematic in that they introduce noise in systems and introduce instability in ring-down times.

In contrast, Applicants' invention as recited in claim 1 is a closed passive fiber optic ring into which a portion of radiation emitted by the coherent source of radiation is coupled and from which a portion of the radiation resonant within the passive fiber optic ring is received

In further support of the above arguments, Applicants respectfully provide the enclosed Declaration Under 37 C.F.R. § 1.132.

Accordingly, Applicants respectfully submit that the rejection of claim 1 under 35 U.S.C. 103(a) as being unpatentable over Hensel et al. in view of Stewart et al. should be withdrawn and the claim allowed.

Although not identical, independent claims 48 and 53 recite features similar to those of claim 1 and, thus, are likewise not subject to rejection for at least the reasons set forth above with respect to claim 1.

With respect to claim 2, the Office Action sets forth that measuring the rate of decay in the Hensel reference to determine trace species levels would have been obvious. Applicants respectfully disagree, however, because the device described by Hensel will not have a rate of decay. Specifically, the absence of reflectors or a closed loop configuration prevents any resonance of the radiation, giving a negligible decay rate that has nothing to do with external species. Applicants respectfully submit therefore that the rejection of claim 2 under 35 U.S.C. 103(a) as being unpatentable over Hensel et al. in view of Stewart et al. should be withdrawn and the claim allowed.

With respect to claims 21 and 22, Hensel does not teach a single mode fiber in a closed loop configuration, and Stewart does not teach a closed loop passive resonant fiber. In fact, Stewart teaches against a passive system, stating on page 2-16, "The ring-down time can be adjusted (and hence the sensitivity) by adjustment of the gain or of the variable attenuator (VA) in the loop." This affirms the fact that Stewart is an active, rather than a passive system. Applicants respectfully submit therefore that the rejection of claims 21 and 22 under 35 U.S.C. 103(a) as being unpatentable over Hensel et al. in view of Stewart et al. should be withdrawn and the claim allowed.

Additionally, claims 2-8, 11-12, 14/11, 14/12, 17-47, 49, 52 and 54-56 depend upon either independent claim 1, 48 or 53 and, thus, are likewise not subject to rejection for at least the reasons set forth above with respect to the independent claims. Applicants respectfully request, therefore, that the rejection of claims 2-8, 11-12, 14/11, 14/12, 17-47, 49, 52 and 54-56 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Hensel and Stewart be withdrawn and the claims allowed.

The Office Action at page 5, paragraph 4, sets forth "claims 9-10, 13, 14/13, 15, 16 and 50-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hensel et al. and Stewart et al. ...and further in view of Lehmann (5,528,040)." Applicants respectfully traverse this rejection of the reasons set forth below.

The Office Action readily admits that the Hensel and Stewart references do not disclose an optical parametric generator, but relies on Lehmann as teaching "the use of an

optical parametric generator (figure 1) for trace species detection." Lehmann does not disclose or suggest, however, a closed passive fiber optic ring for the purpose of detection and measurement of trace species in at least one of a sample liquid or gas. Thus, Lehmann does not make up for the deficiencies of the Hensel and Stewart references discussed above.

Accordingly, Applicants respectfully submit that Hensel, Stewart and Lehmann alone or in any combination neither disclose, teach nor suggest the features of claims 9-10, 13, 14/13, 15, 16 and 50-51. Thus, Applicants respectfully request that the rejection of these claims under 35 U.S.C. 103(a) as being unpatentable over the combination of Hensel et al., Stewart et al. and Lehmann be withdrawn and the claims allowed.

In view of the remarks set forth above, Applicants submit that the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,

RatnerPrestia



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Enclosure: Declaration Under 37 C.F.R. 1.132

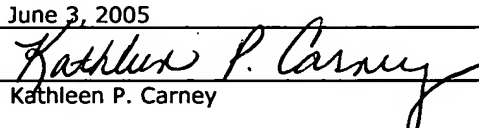
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June 3, 2005



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